※ 考生請注意：本試題不可使用計算機。 請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

Part I：50%

1. Answer the questions. (5% each)
   a. How to determine an increase in growth hormone secretion was due to decreased somatostatin secretion or increase in GRH secretion? (5%)
   b. The removal of posterior lobe of the pituitary lobe results in significant polyuria while the total removal of the pituitary lobe results only in transient poplyuria. Why? (5%)
   c. Describe the biosynthesis of vitamin D in the skin, liver and kidneys. What are the functions of the active metabolite? (5%)
   d. Why is ketosis more severe in type 1 than type 2 diabetes? (5%)

2. Describe the process of bone growth. What is epiphysical closure and what is the mechanism involved? (10%)

3. Discuss the benefits and side effects of long-term, high dose glucocorticoid steroid in the treatment of asthma. What are the mechanisms involved? What happens when the treatment is stopped abruptly? (10%)

4. What are the methods available for the measurement of cardiac output? Compare the advantages and disadvantages of each methods. (10%)

Part II：50%

A. Each question below contains five suggested answers. Choose the <u>one best</u> response to each question. (30%)

1. In which of the following lists are all the named substances synthesized in the kidney and released into blood?
   (A) insulin, renin, and glucose
   (B) red blood cells, active vitamin D, and albumin
   (C) glucose, urea, and erythropoietin
   (D) renin, 1,25-dihydroxyvitamin D and erythropoietin

（背面仍有題目，請繼續作答）

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2. A drug X has a short plasma half-life and must be administered frequently to maintain therapeutic levels. The urinary concentration of X is much higher than the plasma concentration. A substantial amount of X also appears in the feces. What can we say about the renal clearance of X compared with the metabolic clearance rate of X?
(A) The two clearance are the same
(B) The renal clearance is higher than the metabolic clearance rate
(C) The metabolic clearance rate is higher than the renal clearance
(D) There is insufficient information to answer the question

3. The effects of bilateral loss of hippocampal function include
(A) loss of the ability to encode events of the recent past in long-term memory.
(B) loss of working memory.
(C) disappearance of remote memories.
(D) production of inappropriate emotional responses when recalling events of the recent past.

4. The primary route of removal of [Ca^{2+}] from the sarcoplasm during relaxation of a cardiac muscle cells is by
(A) active transport out of cell.
(B) active transport into the sarcoplasmic reticulum.
(C) passive movement out of the cell via L-type calcium channels.
(D) passive exchange with extracellular sodium.

5. Which of the following blood laboratory values would be compatible with hyperthyroidism due to Graves' disease?
(A) high TSH and low T4 levels
(B) low TSH and high T4 levels
(C) high T4 and low T3 levels
(D) low TSH and T4 levels

6. Physiology responses to insulin include
(A) stimulation of amino acid uptake by skeletal muscle
(B) stimulation of glucose reabsorption in the kidney
(C) stimulation of glucose transport in skeletal muscle, red blood cells and the brain
(D) inhibition of triglyceride synthesis in adipose tissue

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7. Which cause of hypoxia is corrected best with supplemental O_2?
(A) anemia
(B) decreased cardiac output
(C) right-to-left shunt
(D) high altitude

8. Which of flowing neurotransmitters would be inactivated by peptidases?
(A) ACH, dopamine
(B) glutamate, GABA
(C) histamine, nitric oxide
(D) substance P, vasopressin

9. Of the following, which circulation receives the highest percentage of the cardiac output:
(A) renal
(B) pulmonary
(C) skeletal muscle during intense exercise
(D) skin during intense exercise

10. Which one of the following is *least likely* to affect Na/K pump activity?
(A) extracellular Mg^{2+} concentration
(B) extracellular Na^{+} concentration
(C) extracellular K^{+} concentration
(D) second messengers (e.g.,cAMP and diacylglycerol)

11. A patient with a duodenal ulcer is treated with cimetidine, a drug that inhibits H^{+} secretion in parietal cells. Which of the following is the mechanism of cimetidine's actin:
(A) Inhibition of H^{+}-K^{+} ATPase
(B) Inhibition of somatostatin
(C) Decreased intracellular cyclic AMP levels
(D) Stimulation of muscarinic receptors

12. Which hormone maintains the corpus luteum of pregnancy?
(A) human chorionic gonadotropin (HCG)
(B) LH
(C) estradiol
(D) progesterone

（背面仍有題目，請繼續作答）

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13. As pancreatic flow rate increases, which of the following has/have increased concentration in pancreatic juice?
(A) Na^+
(B) K^+
(C) HCO_3^-
(D)Cl^-

14. The composition of bile is modified as it flows through the biliary ductules. Which of the following is expected to increase in concentration during this transit?
(A) IgA
(B) glucose
(C) bile acid monomers
(D) alanine

15. In the normal RAS system leading to the production of aldosterone, the rate-limiting step is
(A) the activity of ACE
(B) the production of angiotensin I.
(C) the production of angiotensinogen
(D) the responsiveness of the adrenal gland to angiotensin II

B. Explain following terms. (20%)

1. blood-brain barrier (4%)
2. Gaucher Disease (4%)
3. synaptic plasticity (4%)
4. gap junction (4%)
5. G protein-coupled receptors (4%)